

- V. *An Entomological Excursion to Moncayo, N. Spain*, by
 GEORGE CHARLES CHAMPION, F.Z.S.; *with some
 remarks on the habits of Xyleborus dispar, Fabr.*, by
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[Read March 2nd, 1904.]

PLATES XV. AND XVI.

THE excursion made by Dr. Chapman and myself to the Sierra de Bejar in 1902 having been a fairly successful one, we decided last summer to pay yet another visit to Spain, the irregular range of mountains lying about midway between the Pyrenees and the Guadarrama being our objective on the present occasion. The mountainous region selected was that included between the valleys of the Ebro and the Duero (Douro), commencing near Burgos and terminating eastward in the isolated lofty mass, 7600 feet elevation, known as Moncayo, the latter forming the boundary between the Province of Soria in Old Castile and Aragon. To the south of Moncayo the adjacent districts are of considerable altitude, while to the north the valley of the Ebro is very much lower, and backed by the distant range of the Pyrenees. The geological formation of these mountains, instead of being almost wholly granite, as in the Bejar and Guadarrama Sierras, is very varied, and includes a good deal of limestone; hence we anticipated that there would be a considerable difference in the insect-fauna, and this proved to be the case. The region visited was perhaps too far north for many special Spanish forms, a number of the species met with being common to the Eastern Pyrenees, still there was a considerable admixture of southern types. Leaving London on June 22nd, we travelled, *viâ* Paris, direct to Guéthary, in the Basses-Pyrenees, a pleasant seaside place not far from Biarritz; and after spending a few days there, continued our journey to Burgos. After a day or two here, we moved on to Canales, a centre suggested to us by the manager of the Sierra Company in Burgos, who was kind enough to furnish us with passes by the "Ferrocarril minero de Monterrubio á Villafria" to their present railhead at

Barbadillo, whence the rest of the journey—perhaps fifty miles in all—was made in a country cart. Later on, we shifted our head-quarters to Moncayo, two days' journey from Canales, and about sixty miles distant. On arrival at Canales, we were unable to obtain accommodation at the place recommended by our friends in Burgos, and as the public "posada" was extremely uninviting, we had to hunt up lodgings elsewhere, eventually finding rough quarters in an empty house, which proved, however, to be inhabited by legions of *Cimex lectularius*. This village is the uppermost one on the Najerilla river, an affluent of the Ebro, and just below the ridge separating the provinces of Burgos and Logroño, and as it was a good centre for collecting we remained there from June 27th to July 9th. Though rather low (elevation about 2500 feet), the adjacent mountains were accessible on all sides. These latter ranging up to quite 7000 feet, with the hollows near their summits still filled with snow. The northern slopes of some of the narrow valleys here are clothed with beech forest, and on the south side there is a good deal of oak scrub, which is very dense in places. On the ridge near the village of Huerta there is an extensive pine forest, and this proved to be a productive locality. The mountains elsewhere are clothed with heath almost to their summits, and here and there are patches of *Genista*, which, however, is not in sufficient abundance, when in flower, to give a colour to the slopes, as is the case at Bejar. From Canales two expeditions were made to a limestone cave—the Cueva de la Calera—but without success as regards cave-insects, the few beetles found about the mouth belonging to common species. In some of our excursions here the scarcity of water in these limestone mountains added not a little to the fatigue of the long tramp. Almost the only people encountered during these trips, apart from the occasional "pastores" or shepherds, were individuals engaged in cutting down the abundant asphodels for feeding their pigs, the plants being made into bundles, and carried down on their donkeys' backs. Leaving Canales on July 9th, we caught the diligence starting from Mansilla, a mining village a few miles down the valley, and reached Anguiano the same evening, the road for about three hours lying through the extremely picturesque gorge of the Najerilla (which is not mentioned in the guide books and is apparently unknown to tourists), the last-mentioned

town being situate at its mouth. Anguiano would probably be a good centre for collecting, but we were satisfied with one night there (the "parador" being a vast malodorous stable, with the living-rooms over it, as usual in Spain), leaving at 4 a.m. next day, by the diligence for Logroño. At Logroño, a large city on the Ebro, and the centre of the rich wine-producing district of the Rioja, in the vicinity of which a terrible railway accident had occurred a few days previously, we took the train to Tudela, for Tarazona, arriving there the same evening. After spending a day in this old cathedral city on the Queiles (another affluent of the Ebro, and nearly dry at this season), the extremely narrow streets in the upper part of it reminding us of Cuenca and Albarracin, we made our way up to the old Santuario or Monastery, dedicated to Neustra Señora de Moncayo, five hours distant, involving an ascent of about 4000 feet. Here we were fortunate enough to obtain good accommodation, thanks to the kindness of José M. Sanz Artubucilla, the priest-in-charge, staying from July 12th to 24th. The first half of the journey from Tarazona—usually commenced at 4 a.m.—was through ground cultivated with olives, vines, maize, etc., alternating higher up with brick-fields, an extensive scrub of deciduous oaks growing among loose stones being then entered, followed as we ascended by a broad belt of beech forest. Immediately above this was the Santuario, well sheltered from the wind by a great square mass of perpendicular blackish rock, known as the Peña Negra. Hence to the wind-swept summit the slopes, except where covered with loose shale, are clothed with heath, mostly of a very sweet-smelling, white-flowered species, which when in blossom harboured an immense number of minute insects, appearing to be even more attractive to them than the scattered *Genistæ*. The summit itself, often enveloped in cloud during our stay, has a scattered growth of tussocky grass, etc., affording sufficient pasturage for the numerous goats and sheep that are often taken up there. From the Santuario, which is uninhabited in winter, owing to the large accumulation of snow, a magnificent view is obtained of the broad valley of the Ebro, the river appearing as a mere silver thread from this elevation (5300 feet*), backed by the entire range of the Pyrenees, the Pic de Néthou, the Maladetta group,

* The elevation of the "hermitage" is given in *Murray's Guide* as 275 feet below the summit, this being probably a misprint for 2750.

etc., being clearly visible when the usual summer haze clears off after rain. The storm on the night of July 22nd along the Pyrenees afforded a pyrotechnic display never to be forgotten, vivid flashes of forked lightning from several points at once being almost continuous for several hours, and throwing up into strong relief the serrated black mountain ridges. The Ebro valley, seen from this height, and when the sun is shining, is of a very uniform brick-earth tint, the parts raised above the level of the river looking like flattened terraces of baked mud, and very few trees are visible. From the summit there is a very extensive view of the Province of Soria, and to the south-east the mountains stretching northward from the Sierra de Albaracin; eastward, too, the city of Zaragoza could just be discerned. The beech forest is confined to the northern slope, extending downwards for about 1500 feet below the Santuario, and in the more open parts of this, especially along the unused "carretera" or cart-road, there are plenty of Umbelliferæ, etc., attractive to insects. An excursion was made one day to the Cueva de Agreda, on the western slope, but as before, without result, as the mouth of the cave, owing to its close proximity to the village, served as a corral for goats at night—the interior, in consequence, being very dirty and smoke-blackened. During our stay at this place we were joined for a time by an enthusiastic veteran entomologist, Father Navas, of Zaragoza, whose chief study is the Neuroptera and Trichoptera; he gave us a good deal of local information, and accompanied us on several of our outings. Leaving Moncayo on July 24th, we made our way on foot over the very rugged forest-clad slopes to Agreda, travelling thence by the diligence southward to Soria, an old town on the Duero. On arrival at this place, we found the season too far advanced to make collecting profitable, there was therefore nothing to be done but to return by the way we came, so on the morning of July 26th we left by the daily diligence to Tarazona (8 hours' journey), taking the train thence to Pamplona, 7 hours further on.

The localities visited, or at any rate the Logroño Sierra, have probably not hitherto been systematically worked for the smaller Coleoptera. It may be noted, however, that Moncayo is the recorded habitat of *Cyrtonus cupreovirens* and *Otiorrhynchus caunicus*, and that certain species of *Dorcadion* have been noticed by Escalera from Neila, the

Sierra de la Demanda, and other places in the vicinity of Canales. A list of the species of Coleoptera and Hemiptera-Heteroptera, so far as at present identified, cannot fail therefore to be of interest, especially to show the affinity or otherwise of the fauna of the places visited with that of the nearest adjacent districts which are at all well known, viz. the Pyrenees, the Cantabrian Mountains, and the Sierra de Guadarrama. The forests of beech at Moncayo (those visited near Canales were too dry and not so productive), the pines at Canales (there were none at Moncayo), the mountain tops, the slopes, valleys, etc., had their special insects, the beech alone producing a considerable fauna. The beetles most in evidence on the higher mountains were the species of *Dorcadion*, each district having one or more local forms; two of these abounded in a restricted area on the summit of Moncayo, and another very similar insect was found on the Logroño Sierra. The species at Moncayo, where most abundant, occurred in company with swarms of the nymphs of a grasshopper, perhaps a natural result of one living above and the other below ground in places where grass was most abundant. When at rest, the beetles are rather conspicuous on uniformly-coloured bare earth, but when they were near or among tufts of grass, and amid a horde of jumping grasshoppers, the eye required some training to distinguish them. The likeness between the *Dorcadion* and the Orthopteron may of course have no further meaning than a similar facies induced by an identical habitat; still it may serve to protect the beetles during the short period of their existence in the perfect state. On Moncayo, too, *Coccinella 7-punctata* abounded to an incredible extent, the species being comparatively scarce lower down, swarming under every stone, and the presence there of certain other lowland forms, as *Cartallum ebulinum*, *Lebia cyanocephala*, *Aphodius carpentanus*, etc., would suggest that these insects were migrating or had been carried there by the terrific winds at times prevalent in the district. Other species met with on the higher ground, either at Moncayo or Canales, were *Chlænium dives*, *Limonius nigripes*, various *Corymbites*, *Zabrus*, *Cymindis*, *Heliopathes*, *Timarcha*, *Cyrtonus*, *Pterostichus*, and *Byrrhus*, a *Rhytirrhinus*, a *Crypticus*, *Aphodius scrutator*, and many others. Near the lingering patches of snow, *Carabus helluo* and *C. purpurascens*, *Tachypus cyanicornis*, *Leistus montanus*, *Otiorrhynchus caucicus*, *Bryoporus*

rugipennis, etc., were found; and on the snow itself two *Omophli* in plenty, *Chrysomela gaubili*, *Corymbites*, *Rhizotrogus*, *Aphodius*, *Byrrhus*, and others. On the slopes of Moncayo, between 5000 and 6000 feet, the heath, while in flower, as already mentioned, attracted a vast number of minute Coleoptera, amongst others a tiny *Ceuthorrhynchus* (in the greatest profusion), *Lebia cyanocephala* and *L. trimaculata*, *Gynandrophthalma concolor*, and divers *Anthobium*, *Meligethes*, *Brachypterus*, *Dasytes*, *Danacava*, *Antholinus*, *Hypobæus*, *Phyllotreta*, *Cryptocephalus*, *Pachybrachys*, *Apion*, small *Telephorids*, etc., many of these insects occurring also on *Genista*, but more sparingly. In the hollows hereabouts, near the sources of the small streams, there is an abundant growth of *Aconitum napellus*, and from some Phytophagous larvæ found on this plant, Dr. Chapman subsequently bred *Galeruca laticollis*. Lower down, just above and among the beeches, the Umbelliferæ attracted *Semiadalia 11-notata* in great abundance (a species far outnumbering *Coccinella 7-punctata* at this level), *Leptura scutellata* (including a pallid variety), *Cerambyx scopoli*, *Clytus arietis* (including the var. *bourdilloni*), *Phytæcia affinis* and others of the genus, *Agapanthia cardui*, *Clytanthus figuratus*, *Trichius gallicus*, *Eryx ater*, *Mordella aculeata*, *Haploenemus*, *Lebia*, etc. In the beech woods themselves, *Lebia cyanocephala* was almost the commonest beetle, abounding under the dry loose bark of standing trees, living in company with *Cymindis discoidea* (in plenty), *Helops curaboides*, *Quedius crassus*, and swarms of earwigs, the latter much resembling the *Cymindis* at first sight. This last-mentioned insect also occurred very sparingly under stones on the high ground, and I had previously taken it in the same way in the Sierra Nevada, but here in the beech forest it seemed to have acquired the subcortical habits of a *Dromius*. On old decaying standing beeches the beautiful *Rosalia alpina* was often to be seen running about on the bark in the sunshine, sometimes coming within reach, and one or two trees were riddled with their burrows. It is probable that this insect is often devoured by birds, one mutilated but still lively specimen taken having evidently dropped from a bird's beak. The bark of these trees, or the fungoid growth thereon, harboured a great variety of Coleoptera, as *Platycerus spinifer* (a species usually found amongst the dead stems of *Genista*, in which it is said to breed), *Sinodendron*, *Lygistopterus sanguineus*, *Læmophleus monilis* and

L. ater, *Ditoma*, *Cerylon*, *Diplocelus fagi*, *Litargus bifasciatus*, various red Elaters, *Tenebroides mauritanicus*, *Cœlometopus*, *Abdera quadrifasciata*, *Hallomenus humeralis*, *Orchesia micans*, *Scaptia fuscula*, *Engis*, *Ennearthron*, etc. The old beech stumps attracted *Tomoxia*, and the fresh-cut logs and stumps *Xyleborus dispar*, *Melasis*, *Læmophlæus testaceus* (in abundance), an *Agrilus* (specimens of which were dug out of the solid wood), etc. At Canales most of the old beeches found were too dry to produce much beyond *Thymalus*, *Tillus elongatus*, *Brontes planatus*, *Leptura scutellata*, and the like, though they were riddled with the burrows of *Dorcus*. The pines, however, furnished a considerable number of species, as *Rhagium indagator*, *Pogonochærus fasciculatus*, *Pissodes pini*, three species of *Magdalis*, *Rhinomacer*, four species of *Tomicus*, *Myclophilus minor*, *Hylastes palliatus*, *Corticus pini*, *Platysoma oblongum*, two species of *Plegaderus*, two of *Paromalus*, *Tachyta*, *Placusa*, etc. Under pine chips and logs on damp ground were found *Cœlometopus* (in plenty), two *Carabi*, *Steropus*, *Pterostichus*, *Platyderus*, *Scaphidium*, a small elongate *Anemadus*, and others.

On the higher slopes at Canales or Moncayo various interesting forms were beaten from oak bushes, as *Rhynchites sericeus* and others of the genus, *Cerambyx scopolii*, *Rhopalopus perforatus*, and divers *Strophosomus*, *Phyllobius*, *Polydrusus*, *Balaninus*, *Cryptocephalus*, *Pachybrachys*, *Clythra*, etc. *Henicopus* and *Hymenoptia*, as usual, swarmed on grass-stems on the hill-sides and in the valleys, and a *Chasmatopterus* flew in abundance over the grass; while in dry, arid places the sluggish *Capnodis tenebricosa* could be taken easily from the lichen-covered blackthorn bushes, and also, but rarely, *Ptosima 11-maculata*. Horse-dung in dry places at Canales sometimes harboured the local *Aphodius carpetanus* in abundance (a species also seen almost in the city of Burgos and on the summit of Moncayo), and the usual *Gymnopleurus*, *Ateuchus*, *Orthophagus*, *Hister sinuatus*, etc.

A very interesting new moth, *Pyropsyche moncaunella*, Chapm., was found by Dr. Chapman and myself on the rocks on the upper part of Moncayo. This species has already been figured and described in the Entomologist's Record (xv, pp. 324-330; xvi, pp. 67, 68, t. 2). His figures of the insect are reproduced at the end of this paper, on Plate XVI. A rough map of our route is given

by Dr. Chapman in his paper on *Heterogynis* in the present volume of our Transactions, on Plate XIII, and also a view of Canales, on Plate XIV.

At Guéthary, in the Basses-Pyrenees, where we broke the journey both going and returning, a few interesting beetles were found, as *Aëpys robini*, *Actocharis marina*, *Eubria palustris*, *Aphanisticus emarginatus* (in profusion by sweeping rushes in a marshy place), etc.

The following is a list of the Coleoptera and Hemiptera-Heteroptera so far as at present identified:—

[Monc. = Moncayo; Can. = Canales; Tar. = Tarazona; Burg. = Burgos.]

COLEOPTERA.

Cicindela sylvatica, Linn., and *C. campestris*, Linn., Can. *Curabus purpurascens*, Fabr., summit of Moncayo; *C. helluo*, Dej., Monc., Can.; *C. nemoralis*, Müll., var., under pine-chips in the Pinars between Canales and Huerta. *Leistus montanus*, Steph., one specimen near the summit of Moncayo. *Notiophilus aquaticus*, Linn., Can., Monc. *Tachypus cyanicornis*, Pand., under stones, near the snow, Monc. *Bembidium laterale*, De G., Monc.; *B. lampros*, Herbst, Can.; *B. quadriguttatum*, Fabr., Soria, Tar.; *B. quadrimaculatum*, Linn., Soria; *B. hispanicum*, Dej., banks of the Duero, Soria; *B. fasciolatum*, Duft., with the preceding; *B. nitidulum*, Marsh., Can.; *B. minimum*, Fabr., Monc.; *B. normannum*, Dej., Soria. *Tachyta nana*, Gyll., Can., under pine-bark. *Platynus viridicupreus*, Goeze, Soria. *Calathus punctipennis*, Germ., *C. fuscus*, Linn., and *C. piccus*, Marsh., Can. *Pristonychus terricola*, Herbst, commonly at Canales, in the mouth of a cave. *Pecilus dimidiatus*, Oliv., *P. coerulescens*, Linn., and *P. crenulatus*, Dej., Can. *Steropus lacordairei*, Putz., common under stones, Can.; *S. globosus*, Fabr., Can., Monc. *Haptoderus nemoralis*, Graells, not rare, under large stones in the beech forest, Monc. *Platyderus montanellus*, Graells?, Can.; *P. ruficollis*, Marsh., var.?, Monc. *Zabrus neglectus*, Schaum, Can., Monc., not rare, under stones. *Amara curynota*, Panz., Monc; *A. equestris*, Duft., var. *zabroides*, Dej., under stones, Can.; *A. eximia*, Dej., Can. *Acinopus picipes*, Oliv., Can. *Ditomus fulvipes*, Dej., Can. *Aristus capito*, Dej., Burg., Can., on the roads towards evening; *A. sphærocephalus*, Oliv., Can., *Ophonus sabulicola*, Panz., and *O. azureus*, Fabr., Can. *Harpalus honestus*, Duft., *H. attenuatus*, Steph., *H. rubripes*, Duft.,

H. scripes, Quens., *H. picipennis*, Duft., etc., Can. *Chlænus velutinus*, Duft., on the banks of the Duero, Soria, and near the source of a small stream, Monc.; *C. vestitus*, Payk., Soria; *C. dives*, Dej., sparingly, on the mountains, Can. *Lebia cyanocephala*, Linn., in the greatest profusion, under loose bark of beech trees, on heath, broom, etc., Monc.; *L. rufipes*, Dej., Can.; *L. trimaculata*, Vill., on herbage, etc., Monc. *Metabletus obscuroguttatus*, Duft., Monc. *Dromius quadrisignatus*, Dej., under beech-bark, Monc. *Cymindis variolosa*, Fabr., under stones, Monc., Can.; *C. discoidea*, Dej., in plenty under loose dry bark of old beech trees, Monc.; *C. scapularis*, Schaum, Can.; *C. ruficeps*, Chaud., Monc., Can.; and others of the genus.

Oxygota platyptera, Fairm., summit of Moncayo, one specimen. *Aleochara discipennis*, Rey, Monc.; *A. clavicornis*, Redt., Can. *Atheta nigrifula*, Grav., in plenty, in bones, etc., placed in the cave, Can. *Thectura cuspidata*, Er., under beech-bark, Monc. *Placusa complanata*, Er., in abundance under pine-bark, Can. *Tachyusa balteata*, Er., *T. coarctata*, Er., and *T. constricta*, Er., banks of the Duero, Soria. *Bryoporos rugipennis*, Pand., summit of Moncayo, one specimen in moss. *Mycetoporos brunneus*, Marsh., Can. *Ischnopoda umbratica*, Er., with the preceding. *Autalia impressa*, Oliv., Monc. *Quedius crassus*, Fairm., sparingly under loose bark of standing beeches, Monc.; *Q. mesomelinus*, Marsh., *Q. fuliginosus*, Grav., Can., Monc. *Icistotrophus murinus*, Linn., Can. *Ocypus ophthalmicus*, Scop., under stones, Monc., Can.; *O. brunripes*, Fabr., Monc. *Philonthus atratus*, Grav., *P. ebeninus*, Grav., *P. quisquiliarius*, Gyll., banks of the Duero, Soria; *P. splendidulus*, Grav., under bark, Can. *Othius laeviusculus*, Steph., Monc. *Xantholinus tricolor*, Fabr., Monc.; *X. fulgidus*, Fabr., Soria, Tar. *Lathrobium multipunctum*, Grav., Tar. *Pæderus ruficollis*, Fabr., Soria. *Platystethus cornutus*, Grav., and *P. nitens*, Sahlb., Tar. *Bledius fracticornis*, Payk., Tar., Soria. *Omalium florale*, Payk., Monc. *Anthobium adustum*, Kies., Monc., Can.; *A. hispanicum*, Bris., Can., in plenty on flowers; *A. angustum*, Kies., Monc.

Anemadus transversostriatus, Murr., Can., rarely, under pine-chips. *Silpha nigrita*, Creutz., *S. undata*, Müll., and *S. rugosa*, Linn., Can. *Phosphuga atrata*, Linn., Monc. *Scaphidium quadrimaculatum*, Oliv., Can. *Schaphisoma agaricinum*, Linn., Can. *Olibrus bisignatus*, Mén., Can., Monc., Soria; *O. biplagiatus*, Guill., Can. *Engis humeralis*, Fabr., Monc., in rotten beech. *Atomaria fuscipes*, Gyll.,

Monc. ; *A. analis*, Er., Monc., Burg. *Litargus bifasciatus*, Fabr., Monc., common, under beech-bark. *Diphyllus lunatus*, Fabr., Monc., with the preceding. *Brachypterus cinereus*, Heer, Monc. *Meligethes brassicæ*, Scop., var. *australis*, Küst., Monc., in abundance on *Erica* flowers high up on the mountain slope ; *M. tristis*, Sturm, Monc., Can. ; *M. fuscus*, Oliv., and others of the genus, Monc. *Thalycra fervida*, Oliv., Monc. *Thymalus limbatus*, Fabr., Can., under dry beech-bark. *Tenebroides mauritanicus*, Linn., Monc., not rare under beech-bark. *Rhizophagus bipustulatus*, Fabr., Monc. *Ditoma erenata*, Fabr., Monc., under beech-bark. *Cerylon histeroideus*, Fabr., and *C. ferrugineum*, Steph., Monc., with the preceding. *Brontes planatus*, Linn., Can., under beech-bark. *Læmophloeus testaceus*, Fabr., in abundance under bark of recently felled beeches ; *L. monilis*, Fabr., and *L. ater*, Oliv., rarely, under beech-bark. *Airaphilus carpentanus*, Heyd., Monc. *Dermestes murinus* Linn., Can. *Byrrhus depilis*, Graells, Can. ; *B. dorsalis* Fabr., Can., Monc. ; *B. fasciatus*, Fabr., Monc. *Cytilus sericeus*, Forst., Monc. *Pedilophorus auratus*, Duft.?, summit of Monc., rarely, under stones, mostly found dead and broken. *Paromalus flavicornis*, Herbst, and *P. parallelo-pipedus*, Herbst, Can. *Platysoma oblongum*, Fabr., Can., in abundance under sappy pine-bark ; *P. frontale*, Payk., Can., two specimens, under stones. *Hister quadrimaculatus*, Linn., var. *gagates*, Ill., *H. amplicolis*, Ill., *H. fimctarius*, Herbst, *H. bissestriatus*, Fabr., Can., Monc., more or less common in dung. *Plegaderus sanatus*, Truqui, rarely, and *P. saucius*, Er., commonly, under pine-bark, Can. *Saprinus lantus*, Er., Can., two specimens, under stones. *Parnus lutulentus*, Er., Can.

Lucanus cervus, Linn., Can., Anguiano. *Dorcus parallelo-pipedus*, Linn., Monc., in beech. *Platyccerus spinifer*, Schauf., Can., Monc., very rarely, in beech. *Sinodendron cylindricum*, Linn., Can., Monc., in beech. *Scarabæus laticollis*, Linn., Monc. *Gymnopleurus flagellatus*, Fabr., Can. *Sisyphus schæfferi*, Linn., Can. *Onthophagus lemur*, Fabr., Can. ; *O. schreberi*, Linn., Can., Burg. ; *O. verticicornis*, Laich., Can. ; *O. furcatus*, Fabr., Can., Burg. *Aphodius scrutator*, Herbst, Can., a few specimens high up on the mountains ; *A. erraticus*, Linn., *A. fossor*, Linn., *A. hæmorrhoidalis*, Linn., *A. scybalarius*, Fabr., *A. sordidus*, Fabr., *A. biguttatus*, Germ., *A. luridus*, Fabr., *A. scrofa*, Fabr., *A. obscurus*, Fabr., and others, Can. ; *A. carpentanus*, Graells, in abundance

in horse-dung in dry places, Can., and very sparingly at Moncayo, one example occurring on the summit, also found singly close to Burgos. *Ammæcius frigidus*, Bris., high up on Moncayo. *Pleurophorus cæsus*, Panz., common on the wing along the roadsides towards evening, Burg. *Geotrupes vernalis*, Linn., Monc., Can. *Phyllognathus silenus*, Fabr., Tar., found dead on the road. *Rhizotrogus pygialis*, Muls., Soria; *R. solstitialis*, Linn., var. *pineticola*, Graells, Monc.; *R. ater*, Fabr., Can.; *R. lusitanicus*, Gyll., Can.; *R. marginipes*, Muls., Can. *Triodonta aquila*, Lap., Can. *Serica mutata*, Gyll., Soria. *Chasmatopterus villosulus*, Ill., Can., Monc., males as usual in abundance on the wing, females sparingly at rest on flowers. *Hymenoptia rugulosa*, Muls., Can., Monc., common on grass stems, etc. *Anisoptia bætica*, Er., Can. *Hoplia philanthus*, Füssl., Monc., Can. *Cetonia floricola*, Herbst, *C. oblonga*, Gory, and *C. morio*, Fabr., Tar., Can. *Trichius fasciatus*, Linn., Can.; *T. gallicus*, Heer, in plenty on Umbelliferæ, in the beech forest, Monc.

Capnodis tenebricosa, Herbst, Can., Monc., not rare on blackthorn-bushes in dry, hot places, the grey markings on the prothorax exactly resembling the patches of lichen on the stems of these plants. *Ptosima 11-maculata*, Herbst, Can., one specimen with the preceding. *Agrius viridis*, Linn., var. *nocivus*, Ratz., Monc., dug out of the hard wood of beech; and others of the genus. *Acmaeodera flavofasciata*, Pill., Monc., Can. *Anthaxia funeralis*, Ill., *A. millefolii*, Fabr., and *A. confusa*, Lap., Monc., Can.

Elater ferrugatus, Lac., Monc., Can.; *E. clongatulus*, Fabr., Can.; *E. cinnabarinus*, Esch.?, and *E. croceatus*, Lac., Monc., in beech, rarely. *Melanotus tenebrosus*, Er., Can. *Limonius nigripes*, Gyll., on the mountains, Can.; *L. minutus*, Linn., Monc. *Cardiophorus signatus*, Oliv., *C. equiseti*, Herbst, Can., commonly. *Athous lateralis*, Bris., and others of the genus, Monc., Can. *Betarmon pieipennis*, Bach, Monc., Can. *Corymbites eupreus*, Fabr.?, Can.; *C. latus*, Fabr., commonly on the mountains, Can.; *C. æneus*, Linn., dark var., summit of Moncayo, not uncommon; *C. holosericeus*, Oliv., Monc., Can. *Helodes minuta*, Linn., Monc.

Lygistorpterus sanguineus, Linn., Monc., rarely, in old beech trees. *Lampyrus noctiluca*, Linn., Monc., at light. *Telephorus abdominalis*, Fabr., Monc.; *T. lividus*, Linn., *T. bicolor*, Herbst, and many others, Monc., Can. *Rhagonycha genistæ*, Kies., Monc.; *R. hesperica*, Baudi, Can., Monc.

Malthinus and *Malthodes*, various spp., Monc., Can. *Hypobæus alicianus*, Duv.,* Monc., Can. *Malachius viridis*, Fabr., Monc., Can. *Antholinus amictus*, Er., Monc., common on heath. *Churopus concolor*, Fabr., Can. *Henricopus heydeni*, Kies.?, Monc., Can., males in profusion, females sparingly, as usual, and one or two other species of the genus. *Dasytes subæneus*, Schönh., *D. ærosus*, Kies., Monc.; *D. plumbeus*, Müll., Can., and others. *Psilothrix cyaneus*, Oliv., Monc., Can. *Dolichosoma lineare*, Rossi, Can. *Haploenemus albipilis*, Kies., Monc., common on flowers, and others of the genus. *Danacea atripes*, Graells, Monc.; *D. reyi*, Proch., Can., a few specimens, and others of the genus. *Tillus elongatus*, Linn., Can., on a dead beech. *Thanasimus formicarius*, Linn., Can., on pine logs. *Trichodes apicarius*, Linn., *T. leucopsideus*, Oliv., and *T. ammos*, Fabr., Can., not rare, on flowers. *Priobium castaneum*, Fabr., Monc. *Lasioderma larve*, Ill., Soria; *L. hæmorrhoidale*, Ill., Can., on flowers. *Xyletinus ater*, Panz., *X. laticollis*, Duft., etc., Can., Monc., on flowers. *Sphindus dubius*, Gyll., Can., in fungoid growth on beech. *Cis boleti*, Fabr., and *C. setiger*, Mell., Monc. *Ennearthron affine*, Mell., Monc., in fungus on beech.

Stenosis hispanica, Sol., under stones, Monc. *Asida goudoti*, Sol., and *A. sericea*, Oliv., Can., not rare under stones. *Blaps gigas*, Linn., *Scaurus punctatus*, Herbst, and *Akis elegans*, Charp., more or less abundant in the outskirts of Tarazona. *Dendarus castilianus*, Pioch., under stones, Monc. *Heliopathes perroudi*, Muls., and others of the genus, more or less abundantly, Monc. *Oloerates abbreviatus*, Oliv., Can. *Crypticus quisquilius*, Linn., var. *pyrenæus*, Baudi,† commonly on the summit of Moncayo; *C. zophosoides*, Heyd., Can. *Corticus pini*, Panz., Can., under pine-bark. *Celometopus clypeatus*, Germ., in plenty under pine-chips, Can., and very rarely at Moncayo. *Helops caraboides*, Panz., in profusion under loose beech-bark, Monc.; *H. laticollis*, Küst., Monc.; *H. coriaceus*, Küst., Monc. *Eryx ater*, Fabr., Monc., one specimen. *Gonodera luperus*, Herbst, Can. *Omophlus lepturoides*, Fabr., in abundance, and *O. picipes*, Fabr., sparingly, on the mountains, Can., Monc., on the wing,

* Omitted from my Bejar list last year. I have also taken it at Vernet, Pyrén.-or.

† These specimens are considerably smaller than those I have taken at Mont Louis in the Pyrenees.

and by beating pines, etc., and found on nearly all the patches of snow. *Isomira murina*, Linn., in abundance, on flowers, Monc.; *I. antennata*, Panz., Can. *Lagria grenieri*, Bris., in plenty on *Genista*, Monc., Can.; *L. hirta*, Linn., Monc. *Hallomenus humeralis*, Panz., *Orchesia micans*, Panz., and *Abdera quadrifasciata*, Curt., in numbers, in rotten beech, Monc. *Scraptia dubia*, Oliv., Can., Monc., commonly on oak, even in very dry places, and always extremely active; *S. fuscula*, Müll., one specimen, Monc., in rotten beech. *Rhinosimus ruficollis*, Linn., and *R. planirostris*, Fabr., Monc., under beech-bark. *Anthicus tenellus*, Laf., Soria; *A. tristis*, Schmidt, Can. *Tomoxia biguttata*, Gyll., on beech stumps, Monc. *Mordella aculeata*, Linn., Monc., Can., Soria, common on flowers. *Mordellistena episternalis*, Muls., and *M. brevicanda*, Boh., Can.; *M. pumila*, Gyll., and *M. micans*, Germ., Monc., Can.; *M. parvula*, Gyll., Monc. *Silaria trifasciata*, Chevr., and *S. quadrimaculata*, Gyll., Monc., Can. *Anaspis subtestacea*, Steph., and others of the genus, Monc., Can. *Cerocoma schreberi*, Fabr., on flowers, Can. *Melœ majalis*, Linn., and *M. brevicollis*, Panz., Can. *Zonabris quadripunctata*, Linn., *Z. variabilis*, Pall., *Z. hieracii*, Graells, *Z. dejeani*, Gyll., *Z. fuesellini*, Panz., and others of the genus, Can., Monc., Soria. *Coryna billbergi*, Gyll., Monc., Can. *Ædamera podagrariæ*, Linn., *Æ. flavipes*, Fabr., *Æ. subulata*, Oliv., *Æ. nobilis*, Scop., and *Æ. lurida*, Marsh., Can., Monc. *Asclera cærulea*, Linn., Monc., in beech.

Otiorrhynchus caunicus, Perez (*amputatus*, Chevr.), sparingly under stones, moss, etc., at or near the summit of Moncayo; *O. ovatus*, Linn., Monc. *Phyllobius tuberculifer*, Chevr., Can., Monc., in plenty, by beating oak, etc. *Polydrusus scitifrons*, Duv., Monc., Can.; *P. cervinus*, Linn., Monc.; *P. impressifrons*, Gyll., Can.; *P. confluens*, Steph., Can. *Sciaphilus carinula*, Oliv., Can., on *Genista*. *Strophosomus crinaceus*, Chevr., Monc., Can.; *S. coryli*, Fabr., Monc.; *S. affinis*, Stierl.?, Can., not uncommon; *S. picticollis*, Seidl.?, Monc., Can.; *S. faber*, Herbst, Monc., and others of the genus. *Brachyderes lusitanicus*, Fabr., Can., on pines; *B. brucki*, Tourn.?, Can., on oak. *Sitones flavescens*, Marsh., var. *cinnamomeus*, All., Monc.; *S. erinitus*, Herbst, Can. *Cathormiocerus lapidicola*, Chevr., Can., and *C. gracilis*, Seidl., Monc., both under stones, on the mountains. *Brachycerus pradieri*, Fairm., Can. *Cleonus pedestris*, Poda, *C. cinereus*, Schr., and *C. sulcirostris*, Linn., Can.; *C.*

obliquus, Fabr., Monc. *Lixus cardui*, Oliv., Can. *Larinus latus*, Herbst, Soria; *L. jaccæ*, Fabr., Can., and others of the genus. *Rhinocyllus latirostris*, Latr., Can. *Rhytirhinus stableaui*, Fairm.?, rarely, under stones, on the summit of Moncayo, a species difficult to obtain in good condition, the metallic scales being easily abraded. *Anisorrhynchus bajulus*, Oliv., Can. *Pissodes notatus*, Fabr., Can., on pines. *Pachytychius sparsutus*, Oliv., on *Genista*, and *P. hæmatoccephalus*, Gyll., Can.; *P. scabricollis*, Ros., Soria. *Smicronyx* sp., Can. *Cossonus linearis*, Fabr., Burgos, on the wing towards evening. *Brachytemnus porcatus*, Germ., Can., in abundance under bark of dead pines. *Cœliodes ruber*, Marsh., *C. ilicis*, Bed., and *C. cardui*, Herbst, Monc. *Ceuthorrhynchus macula-alba*, Herbst, *C. geographicus*, Goeze, *C. marginatus*, Payk., *C. cyanipennis*, Germ., Can.; *C. nanus*, Gyll., var., in the greatest profusion on *Erica*, while in flower. *Ceuthorrhynchidius horridus*, Panz., Monc.; *C. urens*, Gyll., Can.; *C. troglodytes*, Fabr., var.?, a small form approaching *C. frontalis*, Bris., Can. *Balaninus pellitus*, Boh., and *B. villosus*, Fabr., Can., on oak. *Anthonomus rubi*, Herbst, Monc. *Tychius quinquepunctatus*, Linn., Can., and others of the genus. *Sibinia primita*, Herbst, Monc. *Orchestes pilosus*, Fabr., *O. quercus*, Linn., and *O. fagi*, Linn., Monc., Can. *Rhamphus pulicarius*, Herbst, Can. *Mecinus pyraster*, Herbst, Can. *Miarus campanulæ*, Linn., Can. *Gymnetron noctis*, Herbst, Can. *Nanophyes niger*, Waltl, Monc., Can., sparingly on heath. *Magdalis memnonia*, Gyll., *M. phlegmatica*, Herbst, and *M. violacea*, Linn., on pines, Can. *Apion fuscirostre*, Fabr., and *A. squamigerum*, Duv., on *Genista*, *A. wenckeri*, Bris., on *Cistus*, *A. flavimanum*, Gyll., *A. atomarium*, Kirby, *A. urticarium*, Herbst, *A. vorax*, Herbst, etc., Monc.; *A. sulcifrons*, Herbst, Soria; *A. craccæ*, Linn., *A. æthiops*, Herbst, etc., Can. *Rhynchites sericeus*, Herbst, Can., Monc., very sparingly on oak, on the mountain sides. *R. encovirens*, Marsh., *R. pubescens*, Fabr., Can.; *R. olivaceus*, Gyll., Monc. *Attelabus curculionoides*, Linn., Monc., Can., abundant everywhere on young oaks. *Rhinomacer attelaboides*, Fabr., Can., one specimen on pine. *Platyrhinus latirostris*, Fabr., Monc., in fungoid growth on beech. *Brachytarsus fasciatus*, Forst., Monc. *Urodon suturalis*, Fabr., Can.; *U. rufipes*, Oliv., Can., Soria. *Bruchus* spp., undetermined, Monc., Can. *Hylastes palliatus*, Gyll., common under pine-bark, Can. *Hylastinus trifolii*, Müll., in dead stems of *Genista*, Can. *Myelophilus minor*,

Hart., in felled pines, Can. *Phlæophthorus rhododactylus*, Marsh., in dead stems of *Genista*, Can. *Pityogenes bidentatus*. Herbst, Can. *Tomicus sexdentatus*, Boern., abundant, *T. laricis*, Fabr., *T. acuminatus*, Gyll., and *T. longicollis*, Gyll., in felled pines, Can. *Taphrorychus bicolor*, Herbst, Monc. *Xyleborus dispar*, Fabr., Monc., not uncommonly in freshly-cut beech stumps; the sexes in about equal numbers, the males usually two or three together about the entrances of the burrows of the females, the latter occasionally on the bark, but mostly in the burrows, from which they were not easily extracted; *X. monographus*, Fabr., Monc. *Rhagium indagator*, Fabr., Can., on pines. *Toxotus meridianus*, Linn., Can. *Leptura scutellata*, Fabr., Monc., Can., common on Umbelliferæ in beech woods, including a pallid variety (*ochracea*, Faust?); *L. fulva*, De G., Monc.; *L. livida*, Fabr., and *L. cerambyceiformis*, Schr., Monc., Can.; *L. hybrida*, Rey, Monc., common on Umbelliferæ. *Acmæops collaris*, Linn., Can. *Strangalia maculata*, Poda, Monc., Can.; *S. attenuata*, Linn., on *Cistus* flowers, Monc.; *S. bifasciata*, Müll., Can.; *S. nigra*, Linn., Can. *Allosterna tabacicolor*, De G., Monc. *Grammoptera ruficornis*, Fabr., Monc. *Cartallum ebulinum*, Linn., one specimen on the summit of Moncayo. *Dilus fugax*, Oliv., Can. *Cerambyx scopoli*, Füssl., on Umbelliferæ, and also beaten from oak, Monc., Can. *Rhopalopus femoratus*, Linn., Monc., Can., rarely, by beating oak, etc. *Rosalia alpina*, Linn., Monc., males not rare on trunks of large decaying beeches, and occasionally found dead in old burrows in the trees; one living mutilated example found had evidently been dropped by a bird: a most beautiful insect alive. *Xylotrechus arvicola*, Oliv., Can., Monc. *Clytus arictis*, Linn., and its var. *bourdilloni*, Muls., on flowers, Monc. *Clytanthus trifasciatus*, Fabr., Soria; *C. figuratus*, Scop., Monc., not rare on Umbelliferæ. *Dorcadion terolense*, Esc., var. *albarium*, Esc., and *D. seguntianum*, Esc., var., abundant in a restricted place on the summit of Moncayo, both varying in the colour of the vestiture; an almost bare form of the female of *D. seguntianum* occurred, as in some others of the genus. *D. neilense*, Esc., not rare on the summit of the Sierra de la Demanda, near Canales; *D. circumcinctum*, Chevr., Burgos, on the road to the Cartujar; *D. escalera*, Lauff., rarely on Moncayo, where it had previously been taken by Father Navas; *D. spinolæ*, Dalm., Burgos, on the

banks of the irrigation ditches amongst the trees planted on the road to the Cartujar, also singly at Moncayo. *Pogonochærus fasciculatus*, De G., Can., on pines. *Agapanthia asphodeli*, Latr., *A. dahli*, Richt., and *A. cardui*, Linn., Can.; *A. villosoviridescens*, De G., Monc. *Phytæcia cærulescens*, Scop.; *P. pustulata*, Schr., and *P. virgula*, Charp., Can.; *P. affinis*, Harr., Monc.

Donacia discolor, Panz., Monc.; *D. consimilis*, Schr., Can. *Titubæa scæmaculata*, Fabr., Soria. *Labidostomis lusitanica*, Germ., Can., Tar. *Lachnæa sexpunctata*, Scop., Monc., Can.; *L. pubescens*, Duf., Monc., *L. tristigma*, Lac., Can., and others of the genus. *Clythra læviuscula*, Ratz., Monc., Soria. *Gynandrophthalma concolor*, Fabr., Monc., Can., common on *Genista*, *Erica*, etc. *Coptocephala scopolina*, Linn., Monc., Soria. *Cryptocephalus cynaræ*, Suffr., Monc.; *C. lusitanicus*, Suffr., *C. bipunctatus*, Linn., *C. violaceus*, Laich., *C. mystacatus*, Suffr., Monc., Can.; *C. rugicollis*, Oliv., Burg., Can., common on flowers, etc., very variable; *C. crassus*, Oliv., *C. capucinus*, Suffr., *C. pygmæus*, Fabr., Soria; *C. koyi*, Suffr., *C. morawi*, Linn., *C. schæfferi*, Schr., very rarely on oak, *C. quadripunctatus*, Oliv., *C. globicollis*, Suffr., *C. aureolus*, Suffr., *C. hydrochæridis*, Linn., *C. pexicollis*, Suffr., *C. infirmior*, Kr., Can. *Pachybrachys viridissimus*, Suffr., Can.; *P. suffriani*, Schauf.?, Monc. *Timarcha rugipennis*, Perez, Can., Monc., and others of the genus. *Cyrtonus cupreo-virens*, Perez, not rare, under stones, summit of Moncayo. *Chrysomela gaubili*, Luc., Can., one specimen on the snow; *C. americana*, Linn., Monc.; *C. analis*, Linn., Can., and others of the genus. *Phytodecta variabilis*, Oliv., Can., on *Genista*; *P. olivacea*, Forst., Monc. *Plagioderæ versicolora*, Laich., Tar., common. *Malacosoma lusitanicum*, Linn., Can. *Luperus nigrofasciatus*, Goeze, common on *Genista*, *L. lividus*, Joann., on pines, *L. flavipes*, Linn., and *L. niger*, Goeze, Can. *Galeruca tanacetii*, Linn., and *G. laticollis*, Sahlb., the latter bred from larvæ found on *Aconitum napellus*, Monc., and *G. interrupta*, Oliv., on the mountains, Can., two specimens. *Lochmæa suturalis*, Thoms., Monc., on heath. *Galerucella lutcola*, Müll., on elm, Tar. *Crepidodera transversa*, Marsh., Monc. *Mantura chrysanthemii*, Koch, Can. *Psylliodes chalcomera*, Ill., Can., *P. luteola*, Müll., Monc., and others of the genus. *Aphthona lævigata*, Fabr., in abundance on *Euphorbia*, Tar. *Phyllotreta* sp., common on flowers of *Erica*, Monc. *Longitarsus*, *Apteropeda*, etc.,

undetermined. *Hispa atra*, Linn., Can.; *H. testacea*, Linn., Monc., on *Cistus*.

Subcoccinella 22-punctata, Linn., Can. *Semiadalia 11-notata*, Schn., in great abundance on flowers of Umbelliferae, also rarely on the summit, Monc. *Adalia mutabilis*, Scriba, Monc., Tar. *Coccinella 7-punctata*, Linn., in vast numbers under stones all over the summit, and sparingly lower down on flowers, etc., Monc.; varieties occurred with the spots (the common scutellar one excepted) very minute; *C. 14-pustulata*, Linn., Monc., Soria. *Halysia 18-guttata*, Linn., Can. *Exochomus 4-pustulatus*, Linn., Can., Monc. *Micraspis 16-punctata*, Linn., Soria. *Platynaspis luteorubra*, Goeze, Can. *Scymnus* spp. undetermined.

HEMIPTERA-HETEROPTERA.

Eurygaster maura, Linn., Soria; *E. nigrocucullata*, Goeze, Can. *Graphosoma lineatum*, Linn., Monc. *Geotomus punctulatus*, Costa, Can. *Gnathoconus picipes*, Fall., Monc. *Ochetostethus nanus*, H.-S., Can. *Sciocoris macrocephalus*, Fieb., and *S. sp. n. ?*, Monc. *Ælia rostrata*, Poh., Soria, Can. *Neottiglossa flavomarginata*, Luc., Can.; *N. inflexa*, Wolff, Monc.; *N. leporina*, H.-S., Can. *Staria lunata*, Hahn, Can. *Peribalus vernalis*, Wolff, Monc., Soria. *Carpocoris purpuripennis*, De G., Can. *Dolycoris baccarum*, Linn., Monc. *Chlorochroa juniperina*, Linn., Monc. *Palomena prasina*, Pod., Monc. *Pentatoma rufipes*, Linn., Monc. *Eurydema oleraceum*, Linn., Can. *Phyllomorpha laciniata*, Vill., Can. *Centrocoris spiniger*, Fabr., Can. *Syromastes marginatus*, Linn., Monc. *Verlusia quadrata*, Fabr., Can.; *V. sulcicornis*, Fabr., Monc. *Loxocnemis dentator*, Fabr., Can. *Coreus affinis*, H.-S., Soria, Can. *Stenocephalus agilis*, Scop., Monc. *Camptopus lateralis*, Ger., Can. *Therapha hyoscyami*, Linn., Can., Monc. *Corizus crassicornis*, Linn., Can. *C. parumpunctatus*, Schil., Monc. *Macevethus lincola*, Fabr., Can. *Berytus distinguendus*, Ferr. ?, Soria. *Lygæus equestris*, Linn., Monc., Can.; *L. saxatilis*, Scop., Can.; *L. pandurus*, Scop., Monc., Tar.; *L. albomaculatus*, Goeze, Can.; *L. superbus*, Poll., Monc., Can., Soria. *Lygæosoma reticulatum*, H.-S., Can. *Cymus glandicolor*, Hahn, Monc. *Ischnorhynchus geminatus*, Fieb., Monc. *Heterogaster calariæ*, Fourc., Can., common on herbage; *H. artemisiæ*, Schill., Can., Monc., Soria;

H. affinis, H.-S., Can.; *H. urticæ*, Fabr., Can. *Microplax interrupta*, Fieb., and *M. albofasciata*, Costa, Can. *Metopoplax ditomoides*, Costa, Can. *Macroplax fasciata*, H.-S., Can. *Tropistethus holosericeus*, Scholtz, Can. *Macrodema micropterum*, Curt., Monc. *Pterotmetus staphylinoides*, Burm., Can. *Plinthisus longicollis*, Fieb., Monc. *Aphanus alboacuminatus*, Goeze, Can.; *A. pini*, Linn., Monc. *Microtoma atrata*, Goeze, Can. *Trapezonotus ullrichi*, Fieb., Can., in abundance towards evening, on Umbelliferous flowers. *Emblethis verbasci*, Fabr., and *E. angustus*, Mont., Can. *Phyllontocheila angustata*, H.-S., Can. *Copium teuerii*, Host., Can. *Monanthia echii*, Wolff, Can. *Aradus betulæ*, Linn., Can.; *A. depressus*, Fabr., Monc. *Aneuris lævis*, Fabr., Monc. *Gerris gibbifer*, Schm., Tar. *Harpactor iracundus*, Poda, Can.; *H. sanguineus*, Fabr., Can. *Coranus ægyptius*, Fabr., Can. *Prostemma albimacula*, Stein, Can. *Nabis apterus*, Fabr., Can.; *N. fesus*, Linn., Can.; *N. rugosus*, Linn., Monc., Can.; *N. reuterianus*, Puton, Soria. *Piezostethus obliquus*, Costa, Monc. *Anthocoris minki*, Dohrn, and *A. confusus*, Reut., Monc. *Triphleps nigra*, Wolff, Can. *Microphysa pselaphiformis*, Curt., Can. *Acetropis gimmerthali*, Flor, Can. *Megalocera erratica*, Linn., and *M. lincais*, Fuessl., Monc. *Leptopterna dolabrata*, Linn., Monc. *Lopus flavomarginatus*, Don., including a dark variety, Monc., Can.; *L. gothicus*, Linn., Monc.; *L. sulcatus*, Fieb., Monc.; *L. cingulatus*, Fabr., Can. *Phytocoris femoralis*, Fieb., Monc. *Calocoris roscomaculatus*, De G., Can. *Homodemus M-flavum*, Goeze, Can., abundant on Umbelliferæ, etc. *Brachycoleus triangularis*, Goeze, Soria, on *Eryngium*. *Lygus kalmii*, Linn., Monc. *Charagochilus gyllenhali*, Fall., Can. *Capsus cordiger*, Hahn, Can., Monc., and var. *fallaciosus*, Reut., Can.; *C. scutellaris*, Fabr., Soria. *Systemonotus championi*, Reut., Monc., one male specimen, running on the ground amongst heath. *Strongylococis obscurus*, Ramb., Can.; *S. leucocephalus*, Linn., Monc. *Dicyphus pallidicornis*, Fieb., and *D. geniculatus*, Fieb., Monc. *Globiceps parvulus*, Reut., Soria. *Heterocordylus tibialis*, Hahn, and *H. tumilicornis*, H.-S., Monc. *Pachyxyphus cæsareus*, Reut., Monc. *Sthenarus ocellaris*, M. & R., Monc., Can.; *S. bicolor*, M. & R., Monc. *Plagiotylus bolivari*, Reut., Can. *Psallus lepidus*, Fieb., and *P. varians*, H.-S., Monc.

Notes on Xyleborus dispar, Fabr. By Dr. T. A. CHAPMAN.

We had the pleasure of studying a colony of these beetles at Moncayo, and were able fully to accept all that we have been told about them by Ratzeburg, Ormerod, Blandford, etc. Perhaps the best account of them, including as it does their congeners and relatives, is that of H. G. Hubbard in Bulletin No. 7, U. S. Dept. Agr. 1897.

We found that the males never left the stumps in which they are bred, being wingless, and having jaws of little use except for tearing through any little overgrowth of fungus in the burrows. Their degeneration in size and form as compared with the females is, of course, associated with this change of habit.

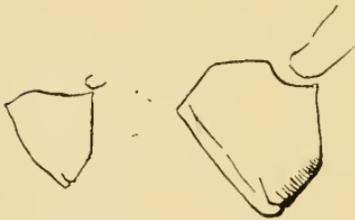


FIG. 1.—Relative size and form of jaws of ♂ and ♀ *X. dispar*. The process to the right is a portion of tendon.

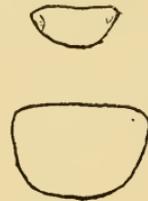


FIG. 2.—Relative width of head of ♂ and ♀ *X. dispar*. The greater anterior posterior diameter of that of the ♀ is due to the protrusion of the head, as much as to larger size.

The relative size of the head of the ♂ and ♀ is lineally as 3 to 2, the width of the male head being 0.6 mm. and of the female 0.9 mm.—making in volume a ratio of 27 to 8, or about $3\frac{1}{2}$ to 1.

The jaws also differ much in size. The greatest length of the male jaw is 0.21 mm. and of the female 0.33 mm. Each has the double tip as in the larval jaw, but in the female this is obviously supplemented by a straight margin, which is very slightly marked in the male; there is a still greater difference in the chitinization, the male jaw being brown and translucent, that of the female dense black.

We found that the female beetle makes the burrows, and ejects the gnawed wood uncaten. The larvæ live entirely on the fungus ("ambrosia") that grows in them.

When young they are straight, but not flounder-shaped, like those of *Platypus cylindrus*. When older they are curved and look not at all like *Platypus*, but very similar to those of other Scotylids or even ordinary Rhynchophora. Their jaws are pointed for scraping and tearing, and contrast with the pointed mandibles of bark beetles.

It may be noted that we saw no traces of beetles attacking anything but (recently) dead or dying timber,

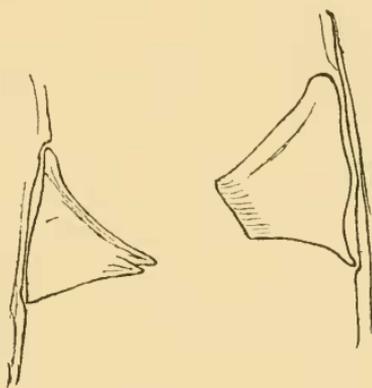


FIG. 3.—Jaw of larva of *X. dispar*, compared with that of *Scolytus multistriatus*.

and considering that they live not on the wood but on a fungus, it seems impossible they could live in healthy timber, even if Hubbard is right, in supposing that the beetles are able to plant and cultivate the fungus. On examining the larvæ after our return home, I was much interested in finding that they had a very remarkable structure in connection with the spiracles.

In a little longitudinal oval hollow there lies flatly against the surface what looks at first like two somewhat elaborated lips of an ordinary spiracle. If they were so the opening would be longitudinal instead of transverse. These two apparent lips, however, appear to be two parallel lobulated sacculi free at their posterior ends, but united together anteriorly where they are connected with a circular skin area, which is probably the true spiracular

opening, opening into the interior of the double sacculus. Round this centre circle is a larger one, that in some prepared specimens looks very like an ordinary spiracular circle. From the centre small circle, a tracheal vessel proceeds inwards. It would seem that the tracheæ open therefore into these sacculi, and not directly into the air,

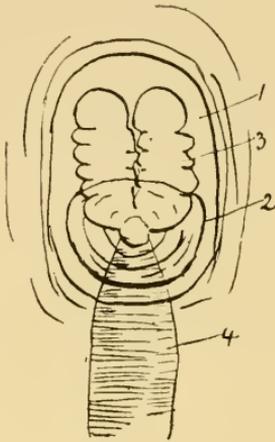


FIG. 4.—Spiracle of larva of *X. dispar*. 1. Hollow in which structure lies. 2. Appears to be spiracle proper. 3. Sacculus outside spiracle lying flatly in hollow. 4. Tracheal tube seen through skin.



FIG. 5.—Diagram of subsegmentation and arrangement of hairs of an abdominal segment of larva of *X. dispar*.

which must pass through the saccular walls. Probably a provision against moist surroundings.

I add a diagram of the disposition of the hairs on an abdominal segment of the larva and of its subsegmentation.